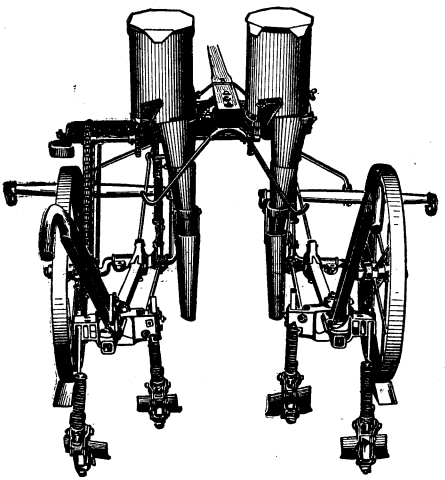
GROWING CORN IN THE SOUTHEASTERN STATES

C. H. KYLE
Agronomist, Office of Cereal Investigations



Walking Cultivator Equipped with Fertilizer Distributors

FARMERS' BULLETIN 1149

UNITED STATES DEPARTMENT OF AGRICULTURE

Contribution from the Bureau of Plant Industry
WM. A. TAYLOR, Chief

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IN THE SOUTHEASTERN STATES larger yields of corn will be produced at less cost by giving greater attention to the following factors:

(1) Drainage and humus.
(2) Deep preparation of the land.
(3) Judicious use of commercial fertilizers.
(4) Special corn machinery.
(5) Adjustment of the cultural method to meet the special requirements of the corn plant.

Corn plants require an abundant and uniform supply of moisture throughout the season. This requirement may be met by improving the water-holding capacity of the soil and preventing the growth of grass and weeds.

The supply of available plant food must be controlled so that there will be a moderate amount of stalk development and a proportionately large ear development. Planting as early as a stand may be secured in order that the early growth may be made in comparatively cool weather, planting in furrows, the application of commercial fertilizers as the particular case demands, and cultivation so that the most fertile portion of the soil is thrown from the rows early in the season and to the rows some time previous to the tasseling period, all tend to give this result.

Good tools specially designed for corn production will save much labor.

GROWING CORN IN THE SOUTHEASTERN STATES.[1]

CONTENTS.

SCOPE OF THIS BULLETIN.

IN THIS BULLETIN the culture of corn in North Carolina, South Carolina, Georgia, Florida, and Alabama is discussed. The recommendations and suggestions made apply mostly to the cotton-growing portions of those States.

PREPARING LAND FOR CORN.

CONSERVATION OF RAINFALL.

Although the average annual rainfall in the Southeastern States ranges from 46 to more than 60 inches and is comparatively well distributed, the most common need of the corn crop is more moisture at some time in its development. Preparation of the land so that it will retain larger quantities of water for longer periods is therefore very important and will give greater returns on the investment than any other one part of the crop's culture. The capacity of a soil for moisture depends largely on the depth to which the land is plowed and the quantity of humus (decaying vegetable matter) incorporated with it.

DRAINAGE.

Poor drainage is indicated in many fields by the irregular patches in which little or no corn grows. Even if actual drowning does not occur in these places, the growth is so weakened and retarded that worms commonly destroy the stand. Besides the usual means of draining, applications of coarse stable manure are recommended.

[1] This bulletin is a revision and extension of Farmers' Bulletin 729, entitled "Corn Culture in the Southeastern States," issued in 1916.

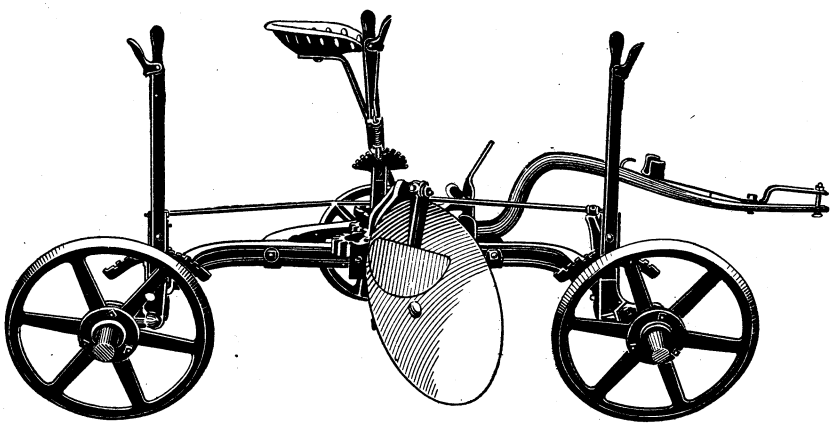

FIG. 1.—A reversible disk plow.

PLOWING.

Land should be broken from 8 to 10 inches deep. If it is in a poor state of cultivation this is best accomplished by turning only that part which previously has been broken and loosening the rest of the depth with a subsoil plow. This plow will be most efficient when it follows in the furrow of the turnplow. In succeeding seasons the land may be turned deeper, the increased depth varying with the quantity of vegetable matter incorporated during the last preparation. When a soil of the required depth has been established the turnplow may be run from 6 to 8 inches deep at each preparation and the subsoil plow only as often as seems necessary to prevent the formation of a compact layer just below the depth of the turnplow.

In order that the plows may accomplish the greatest amount of pulverizing, plowing should be done when samples of the soil crumble most readily in the hand. The period when the best work may be done frequently passes before all the land can be prepared. If the surface of the land is thoroughly pulverized with a disk harrow or other implement as soon as it is sufficiently dry, the period for efficient work will be greatly extended.

Figure 1 illustrates a disk plow that reverses, so that the furrows may all be turned in one direction. It is especially valuable on steep hillsides and where it is necessary to avoid open furrows.

Figure 2 illustrates a type of walking turnplow that is adapted to the mixed sand and clay soils of the South Atlantic States.

Harrows and other types of tools well adapted for pulverizing and smoothing the soil after it has been broken are now common in every community. Frequently, however, the land is not worked until its surface has dried. The closer the breaking plows are followed

by the surface tools, the less time and labor it will require to do the work.

HUMUS.

Nothing will do more to economize the labor of tilling the land and to prolong the good effects of tillage than the presence of an ample quantity of humus in the soil. All land intended for the profitable growing of corn should be stocked with such material as soon as possible. The best preparatory crops for corn are the legumes, some of which are cowpeas, velvet beans, vetch, the clovers, and beggarweeds. These crops may be made to supply much vegetable matter and, in addition, a part or all of the necessary nitrogen.

Manure produced in connection with the raising of live stock always has been associated with the highest type of agriculture. An inconsiderable quantity of it is at present produced on most farms, because there are so few animals. In the Southeastern States, where live stock run on pasture most of the year, manure does not accumulate as it does where the stock are fed in yards or stables for several months. Its great value, however, in connection with the production of corn and other crops should command careful consideration.

COMMERCIAL FERTILIZERS.

Commercial fertilizers should be used to supply such elements of plant food as can not be supplied by the soil and by cropping systems in sufficient quantities for the greatest profit. Usually it is desirable to supply nitrogen, phosphoric acid, and potash in some one or more of their various forms. The proportions of these fertilizer constituents that it is necessary to use vary with the soil and the general cropping system.

Extensive tests over a long period of years are urgently needed as a guide in choosing a fertilizer for each of the many different con-

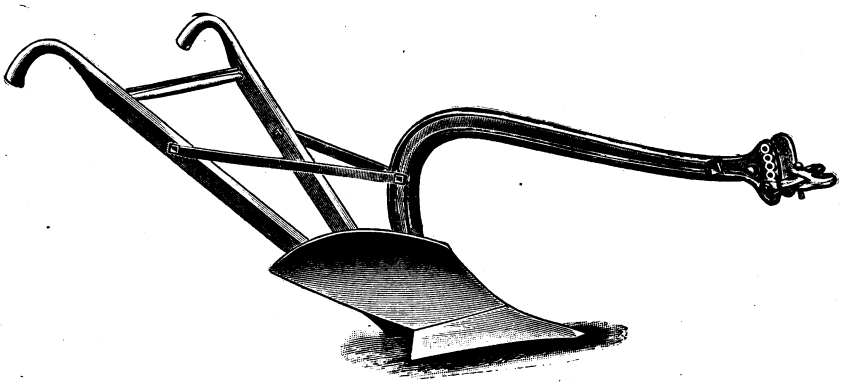

FIG. 2.—A good type of walking turnplow.

ditions in the section. Some of the most satisfactory data available are those of the North Carolina Agricultural Experiment Station. Formulas for fertilizers for corn and other crops based on conditions prevailing in the spring of 1920 have already been suggested in two articles by Prof. C. B. Williams,[2] agronomist of the North Carolina station. The recommendations printed in small type in the following paragraphs are taken from these articles. The formulas are as presented by Prof. Williams, but slight changes have been made in their presentation to suit the purposes of this bulletin.

Where the soil is well supplied with organic matter or where stable manure is applied in moderate quantities and where leguminous crops like cowpeas, soy beans, and clovers are plowed under, the amount of nitrogen required in the fertilizer or fertilizer mixtures will usually be considerably less than for the ordinary poor or moderately poor soils of the Southeastern States. In many cases, where the organic matter is high naturally or has been made so by the use of manures or by the plowing in of leguminous crops, nitrogen may be entirely left out or be reduced to a very small amount in the mixtures. For ordinary soils throughout the South the following or similar mixtures are to be recommended:

For the sandy and sandy loam soils of the Coastal Plain, which are low in organic matter, about 300 pounds per acre of a fertilizer containing 6 to 7 per cent of available phosphoric acid and 4 to 5 per cent of nitrogen should give good results. On very sandy soils, enough potash should be added to the mixtures to give about 2 per cent of this constituent.

For soils in the Piedmont and mountain districts that are low or moderately low in organic matter, use 200 to 400 pounds per acre of a mixture containing 10 to 12 per cent of available phosphoric acid and 3 to 5 per cent of nitrogen.

Where one is buying his own fertilizing materials and doing his own mixing, the following mixtures will give approximately the composition recommended. In these formulas sulphate of potash, carbonate of potash, and kainit have been suggested as the sources of potash. They may ordinarily be used interchangeably, utilizing the one which is cheapest in consideration of its content of potash.

In the selection of the best nitrogenous carrier or carriers for corn, one is to be guided by the relative cost per pound of nitrogen in the common carriers delivered at the farm and somewhat upon the nature of the soils on which the fertilizer mixtures are to be used. Generally speaking, the more open the soil the more important it becomes to use organic carriers in the fertilizer mixtures, at least in part, if applied at planting time.

The mineral sources of nitrogen, like nitrate of soda and sulphate of ammonia, are quite readily soluble in the soil water when applied. If these are used on leachy soils, such as coarse sands, as the sole source of nitrogen, in general they should be applied only to growing crops. In many instances it will be wise, too, to divide the application and make a side dressing just before the corn begins tasseling.

In the Piedmont and mountain sections there is usually very little likelihood of much loss of nitrogen of the more soluble forms when proper methods

[2] Williams, C. B. Fertilizers for Coastal Plain soils. *In* Prog. Farmer, v. 35, no. 6, p. 290, 320–322, illus. 1920.

——— Fertilizers for Piedmont and mountain soils. *In* Prog. Farmer, v. 35, no. 7, p. 364–365, illus. 1920.

of soil conservation and tillage are practiced, even when the mineral resources are used at the time the crops are planted. Especially is this so with soils that contain a good clay subsoil.

Any of the nitrogenous materials in the following formulas, if found cheaper or for any other reasons more advantageous, may be substituted in the following equivalents:

100 pounds of 7 per cent cottonseed meal.
39 pounds of 18 per cent nitrate of soda.
70 pounds of 10 per cent fish scrap.
47 pounds of 15 per cent dried blood.
29 pounds of 24 per cent sulphate of ammonia.
70 pounds of 10 per cent tankage.

FERTILIZER MIXTURES FOR COASTAL PLAIN SOILS.

The formulas to be used should be governed by whether the farmer has any fertilizer materials on hand, and, if not, what will be the cheapest sources of nitrogen and potash, considering the precautions that will have to be observed in the use of materials carrying nitrogen, such as nitrate of soda and sulphate of ammonia. In calculating the formulas which follow, cottonseed meal has been included in a few, because this material is already in the hands of a large number of farmers, obtained in exchange for their cotton seed.

Where corn is grown on average sandy lands the use of the following fertilizer mixtures in the quantities indicated should give good paying results when properly put on and when the corn is properly planted and cultivated:

Formula No. 1:	Pounds.
Acid phosphate, 16 per cent	1,170
Nitrate of soda, 18 per cent	830
Total	2,000

This mixture is only suitable for use where the soils are of a retentive nature. Where they are very sandy with a sandy subsoil this mixture could not be used with satisfactory results.

When the soil is of a sandy or sandy loam nature with a clayey subsoil, the nitrate application can be divided, applying part of it at planting time with the acid phosphate and the other part as a side dressing at the rate of about 100 pounds per acre later. As the mixture given in formula No. 2 is a very concentrated one, only about 100 to 200 pounds of it ordinarily will be required for sandy and sandy loam soils. The formula for this mixture in ton lots is as follows:

Formula No. 2:	Pounds.
Acid phosphate, 16 per cent	1,475
Nitrate of soda, 18 per cent	525
Total	2,000

For very sandy soils with an open sandy subsoil where there is danger of soluble forms of nitrogen leaching out before the crop uses them, it is well to use a part of the nitrogen from organic sources, such as cottonseed meal, dried blood, fish scrap, or tankage, using the one that supplies nitrogen at the lowest rate per pound.

Below is calculated a formula where one-fourth of the nitrogen is derived from cottonseed meal. The other three-fourths of the nitrogen should be reserved as a side application to be applied previous to the time of tasseling at the rate of 150 to 160 pounds per acre. This mixture for ton lots is as follows:

Formula No. 3:	Pounds.
Acid phosphate, 16 per cent	1,340
Cottonseed meal, 7 per cent	660
Total	2,000

The foregoing mixture is a very concentrated one and may be used at the rate of 100 to 200 pounds for corn grown on Coastal Plain soils.

For very sandy soils in sections where fish scrap is available and is the cheapest or most advantageous source of nitrogen, it may be used in mixing in ton lots for corn as specified below:

Formula No. 4:	Pounds.
Acid phosphate, 16 per cent	435
Fish scrap, 10 per cent	1,225
Kainit, 12 per cent	340
Total	2,000

Where cottonseed meal is used on the average sandy soils, the following will be a very good proportion to mix in ton lots:

Formula No. 5:	Pounds.
Acid phosphate, 16 per cent	500
Cottonseed meal, 7 per cent	1,500
Total	2,000

FERTILIZER MIXTURES FOR PIEDMONT AND MOUNTAIN SOILS.

On the retentive soils of the Piedmont and mountain sections, nitrate of soda or sulphate of ammonia, if cheaper than other forms of nitrogen, may be used as the sole source of nitrogen for corn, provided proper precautions are observed in its use.

Following are some formulas with nitrate of soda as a sole source and one each with cottonseed meal and dried blood. If sulphate of ammonia is a cheaper source of nitrogen than nitrate of soda it may be substituted for it at the rate of 29 pounds of sulphate for 39 pounds of nitrate.

Formula No. 6:	Pounds.
Acid phosphate, 16 per cent	1,400
Nitrate of soda, 18 per cent	600
Total	2,000

Where the soil in the Piedmont and mountain sections is a little more open in its nature, the nitrogen application in many cases may be divided.

In formula No. 7 half the nitrogen as nitrate of soda is calculated for applying at planting time and the other half is reserved to be applied later as a side dressing at the rate of about 75 pounds per acre.

Formula No. 7:	Pounds.
Acid phosphate, 16 per cent	1,600
Nitrate of soda, 18 per cent	400
Total	2,000

Using cottonseed meal where it is the cheapest form of nitrogen available, it may be mixed in the following proportions:

Formula No. 8:	Pounds.
Acid phosphate, 16 per cent	1,000
Cottonseed meal, 7 per cent	700
Nitrate of soda, 18 per cent	300
Total	2,000

Using dried blood as the sole source of nitrogen, the following, in approximately the quantities indicated above, will be a good mixture to use when blood is as cheap as other forms or is the cheapest source of nitrogen:

Formula No. 9:	Pounds.
Acid phosphate, 16 per cent	1,200
Dried blood, 15 per cent	800
Total	2,000

No feature of the method of culture requires more intelligence on the part of the grower than the proper supply of commercial fertilizer to corn. For the man who is able and willing to meet the conditions in each case as they arise, the following suggestions are offered: Apply all the fertilizer that supplies nothing but phosphorus and potash on the line of the row at or before the time of planting. It should be mixed with the soil as thoroughly and widely as is practicable. If experience has shown that the early growth is liable to be so slow and weak that there is difficulty in getting a stand, from 25 to 30 pounds of nitrate of soda should be distributed with the seed. The remaining portion of the necessary nitrogen should be supplied from time to time while cultivating the corn. The amount of nitrogen supplied in this way should be governed somewhat by the rate at which the corn is growing. As a general rule, the early applications should be comparatively light and the late applications comparatively heavy, the idea being to avoid an excessively rapid and tender growth at any time and thus prevent some of the damage that is always likely to result from a drought.

Nitrate of soda is the best form in which to supply nitrogen by this system.

Fertilizer attachments for cultivators are the best devices for distributing nitrate of soda.

PLANTING.

TIME OF PLANTING.

The long seasons in the Southeastern States allow considerable latitude in the planting of corn. The question is frequently raised whether one should plant early (from the middle of March to the first week in April) or late (May 1 to July 1).

In considering the question, the budworm or southern corn rootworm is an influential factor.

Over the greater part of the area considered the worms appear most abundantly in April and the first week in May, though this period varies with the latitude and the weather. Many farmers try to plant either before or after this main attack, and it has been found that this practice is desirable.[3]

It has been observed that a cold, wet soil favors budworms. It is probable that artificial drainage will do much to prevent this trouble and thereby render the grower more independent as to the time of planting.

Much of the land in the Southeastern States has fairly good drainage and the soil early becomes warm and well aerated. On this land

[3] Luginbill, Philip. The southern corn rootworm and farm practices to control it. U. S. Dept. of Agr., Farmers' Bull. 950, 12 p., 7 fig. 1918.

the budworms usually do little or no damage at any time, and the farmer is thus freed from the limitations just mentioned. On such land the heaviest yields of corn are usually obtained by planting as soon as a permanent stand can be secured.

MANNER OF PLANTING.

On warm well-drained soil it has become very common to plant corn in the water furrows left by plowing the land into beds, the width being that desired between the rows.

Planting in furrows has three special advantages:

(1) The rate of growth of corn planted in furrows is most easily controlled.

(2) The cultivation of furrow-planted corn at the time when root injury is usually most serious consists largely of working down the soil of the bed about the corn. Injury to the roots by the cultivators is therefore hardly possible.

(3) Corn planted in furrows is much more easily kept clean in the row than that planted on the level, because in bedding many of the weed seeds are thrown out of the furrows, and as the corn grows the earth is filled in about the plants, and the weeds and grass that start there are easily covered.

The preparation of the furrows is usually made a special consideration after the land has been broken flat. The land is first bedded with a plow, a disk harrow, or a disk cultivator. The beds are made wide enough so that the furrows between them will be properly spaced for the rows. Another way that requires less labor and that protects the young corn from the wash of the beds is to open the furrows for planting with a middle breaker. The beds are then completed by throwing the soil away from the rows during the early cultivation. When the subsoil is naturally hard and the land is broken less than 8 inches deep, the bottom of these furrows is frequently loosened as deep as is practicable. The ordinary 1-horse planter is well adapted to planting in these furrows and on beds.

On land that has been properly prepared, much of the above-described labor may be eliminated, time saved, and the work better done by using a lister. These machines open the furrow and plant the corn below the level at the same time. They insure a uniform depth for the seed and make it possible to plant the seed shallow and yet in moist soil. Figures 3 and 4 show good types of the listers which are intended for compact land but will give satisfaction in freshly plowed land if it contains considerable sand. Figure 5 shows a field that has been planted with one of these machines. The rows shown in this illustration were 3½ feet apart, but any other spacing may be used.

When the lister is used and it is desirable to apply commercial fertilizer before planting, a fertilizer drill should precede the planter on the line of the row and distribute the fertilizer slightly above

the depth at which the lister runs. By so doing, the lister will spread the fertilizer to at least the width of its cutting edge and to both sides of the seed, and the danger of injuring the sprouting corn by contact with the fertilizer will be removed.

On poorly drained clay land corn frequently will be drowned out if planted in furrows, especially if these are deep. Any clay land that has had shallow preparation will tend toward the same trouble. Under these conditions the furrows must be shallow or the planting made on the level of the land.

In some cases on low coast land corn must be planted in beds, so that after rains the water will be permitted to escape before the crop is damaged. It is then advisable to make the beds wide enough for two or more rows.

In planting, the seed should be covered just deep enough to have sufficient moisture in which to germinate promptly. A depth greater than this tends to weaken the plants and thus lessens their chances for success. On well-prepared clay land, and especially where the planting is in a furrow, a half inch of cover may be sufficient. When the soil is dry, cloddy, or otherwise poorly conditioned for planting it is necessary to plant deeper.

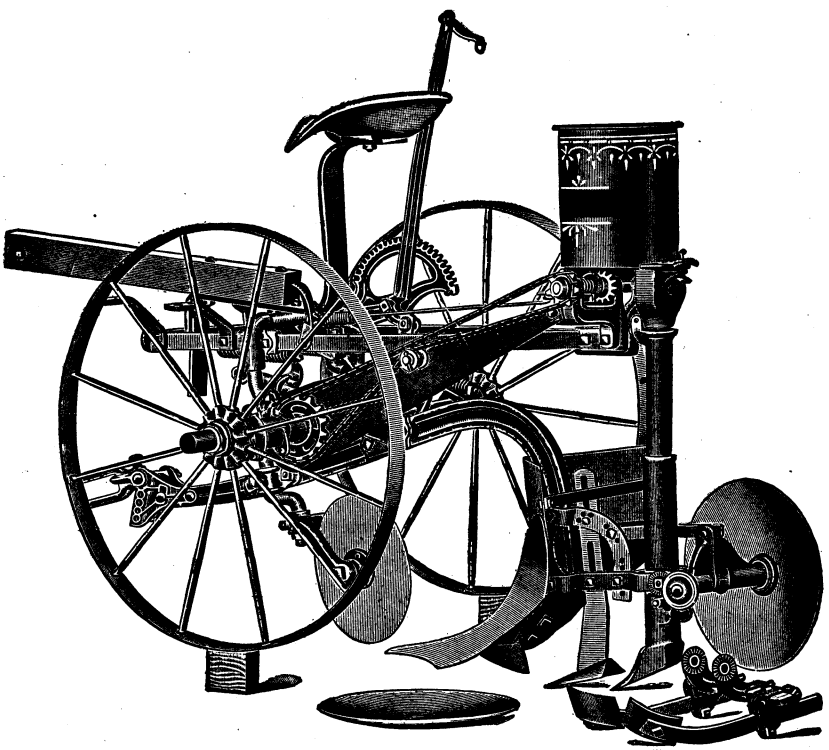

FIG. 3.—A riding lister.

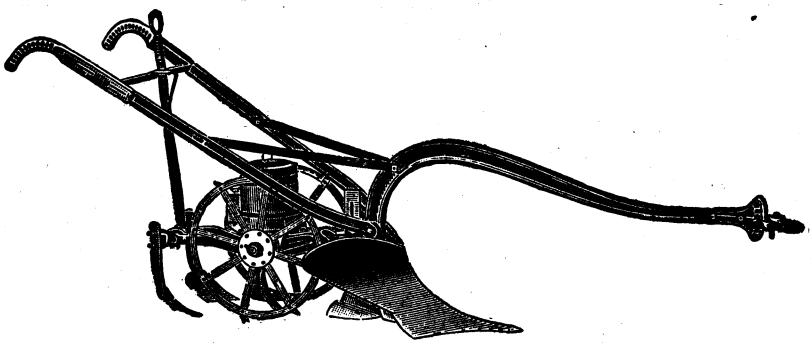

FIG. 4.—A walking lister.

DISTRIBUTION OF PLANTS.

The best distribution of plants over the land is obtained by making the distances between single plants in the row and the distances between rows the same. With such an equal distribution, the least possible loss from competition is experienced. However, in order that sufficient plants be grown upon an acre to utilize most completely the resources of the soil and climate and at the same time permit tillage and other desirable practices, it is usually necessary to sacrifice some of the advantages of even distribution for those to be gained by other desirable cultural practices. These practices frequently may be altered so as to reduce this loss, and the greatest saving in this connection is by means of implements specially adapted to this work. Where general-purpose implements are used, distances between rows of as much as 5 or 6 feet are often considered necessary. By preparing the land thoroughly and then using special machinery for planting and cultivating the corn, the rows need be no more than 3½ feet apart and the distances between plants in the rows can be increased accordingly.

NUMBER OF PLANTS PER ACRE.

The number of plants per acre required for the best results will depend more or less upon the natural fertility of the land, the quantity of fertilizer used, the method of culture practiced, the time of planting, the evenness of the distribution of plants, whether other crops are grown with the corn, the variety, and the season.

The season is, of course, the most important factor influencing the stand required, and as its character can not be foretold, it is evident that specific advice in this connection can not be given.

In practice, corn in the Southeastern States is commonly planted in stands ranging from 3,630 to 7,260 plants per acre, or 12 to 6 square feet per plant. Most stands of corn have been planted with an allowance of 8 to 12 square feet per plant.

Probably the most important factor involved in the proper adjustment of the stand to the ever-varying environment lies within the variety itself. Plants of all varieties of corn tend to adjust themselves to their growing conditions by increasing or decreasing the stalk yields. As a general rule, the varieties capable of the widest range of adjustment are those that have a strong tendency to produce more than one ear per stalk.

GETTING A STAND.

One of the greatest losses due to a defective stand is from the blank spaces seen to a greater or less extent in practically every field. The ability of the plants to utilize extra space rapidly diminishes as the distance increases, and the practical limit probably does not exceed 5 or 6 feet. Beyond this distance the loss, so far as the corn crop is concerned, is complete.

Good seed of a uniform size and shape is an important factor in securing a stand. Special bulletins upon seed corn can be obtained without cost from the United States Department of Agriculture.

Crows frequently do severe damage to the stand by eating the seed or by pulling up the very young plants. Odorous substances have been tried in various ways to prevent such attacks. The substance that is most favorably considered for this purpose at present is coal tar. The seed should be wet with warm water before adding the tar. A teaspoonful of the tar will be sufficient for a peck of corn. The mass must be thoroughly mixed and then dried before planting.

Blank spaces are commonly due to clods and trash that prevent the planter from properly packing the seed in fine moist earth. This trouble can be practically eliminated by using a lister.

FIG. 5.—A field after planting with a lister.

In wet, cold land the seed sometimes is covered with too much soil. On such land the seed should be planted just deep enough to have it in contact with moist soil.

Large quantities of acid fertilizer applied in the row at or about the time the corn is planted may kill sprouting seed or cause the plants to be weak. The trouble may be overcome by making the application ten days or two weeks earlier.

Whenever it is at all difficult to get the desired stand, extra seed should be planted to offset the loss. Thinning will usually result in greater economy than leaving a defective stand or replanting.

CULTIVATION.

Cultivation may be for one or more reasons. Some of these are as follows:

(1) By cultivating the soil away from the row while the corn is young it may retard the rate of growth and thus under certain conditions will favor the success of the crop.

(2) By cultivating the beds between rows of furrow-planted corn to a level, the corn may be suddenly put within immediate reach of the soil's greatest fertility. If this is done at the right time, it will favor the greatest production of grain.

(3) Weed destruction is one of the most important functions of cultivation. Weeds are most easily destroyed as they are coming through the surface of the ground. Thorough surface cultivation will suffice at this time. When weeds and grass are well started, not only is there a rapid exhaustion of the moisture and plant food in the soil but the cultivation necessary to remove them will often seriously damage the crop by covering the corn and, when planted on or above the level, breaking its roots.

(4) When it is desirable to supply commercial fertilizer to the growing crop it is sometimes necessary to mix the application with the soil. For this, cultivation may be required, and the most practical way is to combine this with one of the usual cultivations.

(5) Shallow early cultivation by maintaining a loose soil mulch will conserve soil moisture. Deep early cultivation by permitting more air to enter will dry and warm the soil about the corn. After corn is from 2 to 3 feet high (varying with the space between rows), its roots so fill the soil that it is believed that practically no moisture on its way to the surface can escape them. For this reason late cultivation for the sole object of conserving moisture is now considered impracticable.

When corn is planted in furrows, the early cultivation need consist of little more than harrowing the bottom of the furrows on both sides of the row. If the furrows were made with a lister, a harrow of the type shown in figure 6 is the best. The uniform furrows guide the different sections of the harrow. The mules or horses walk upon the beds and soon require but little attention. One man is thus able to cultivate as many as five rows at a time. If the furrows were made by other means, as previously described, the early cultivation

may be done with cultivators of the type shown in figure 7. In this case, the clevis will have to be so adjusted that the horse or mule can

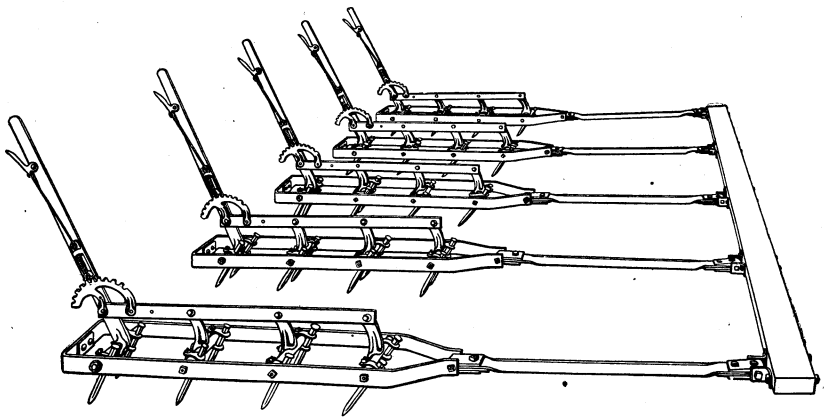

FIG. 6.—A harrow for cultivating corn in lister furrows.

walk just to one side of the row, while the cultivator works both sides of it. It is also necessary to remove at least one of the teeth on each side. The early cultivations of furrow-planted corn should leave the furrows entirely open. If it is desirable to leave them open very late, the beds may require cultivation in order to prevent the growth of weeds, and this can be done with a disk cultivator set to throw the soil away from the rows.

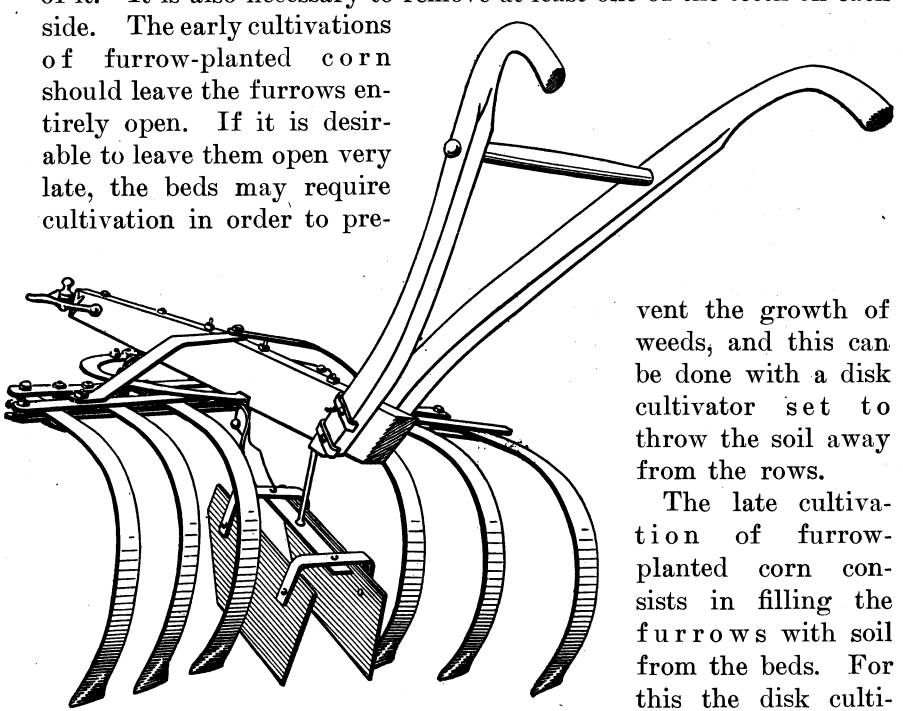

FIG. 7.—A cultivator that can be used to cultivate corn in an ordinary water furrow.

The late cultivation of furrow-planted corn consists in filling the furrows with soil from the beds. For this the disk cultivators are among the best. This leveling process may be done in one or more cultivations, as seems desirable. It may be delayed until it is apparent that the corn is about

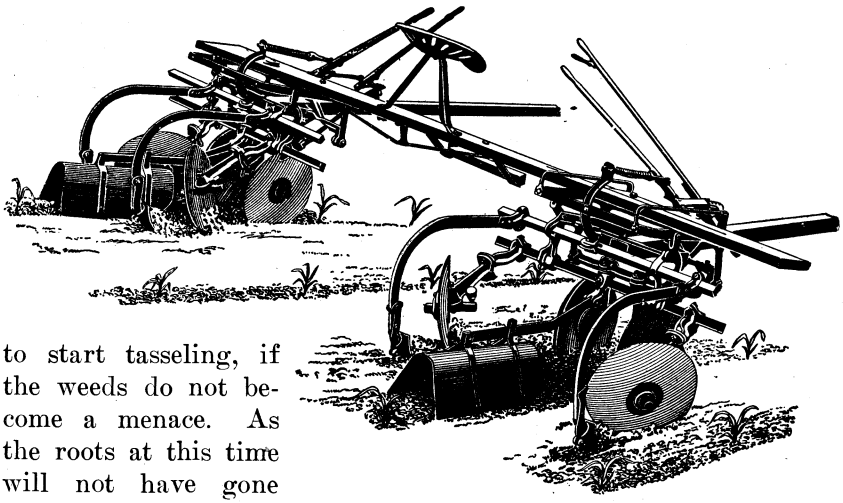

FIG. 8.—A cultivator specially constructed for the first two or three cultivations of lister-planted corn.

to start tasseling, if the weeds do not become a menace. As the roots at this time will not have gone upward into the beds that have been formed between the rows, a loose, deep, rich mulch may thus be thrown about the stalks without the slightest damage, leaving the crop well prepared to pass its most critical period.

In order to destroy weeds, other cultivations may follow the leveling of the land. This should be done, however, with surface-working cultivators, so that it will not be possible to cultivate deep.

A smoothing harrow with teeth pointing backward, or, where the soil is very mellow, a horse weeder with long spring teeth, may be used for the cultivation of corn planted on or above the level of the land until the corn is 6 inches high. After this any cultivator that will not exceed a depth of 2 inches may be used. When the corn is drilled the weeds in the row will have to be removed with a hand hoe. In some cases the corn may be planted in hills, so that it can be cultivated both ways. Much hoeing may thus be eliminated.

Figure 8 illustrates a type of cultivator that is especially adapted to the cultivation of corn in furrows made by a lister. This one cultivates two rows at a time, but 1-row cultivators of this type are made. These machines are so constructed that they are guided by the furrow, and when properly adjusted anyone who is able to drive a team can cultivate two rows at a time in the best manner possible. In using these cultivators the rows are usually gone over once or twice with the disks set to throw the soil from the corn. During the third cultivation the disks are set to throw the soil to the corn, and at this time the furrows are nearly filled. The fourth and last cultivation is usually done with a high-arched cultivator of one of the types shown in figures 9 and 10. In each of these illustrations

the cultivators are equipped with scrapers that smooth the land behind the disks or knives. For the fourth cultivation the gangs on the disk cultivator should be set to throw toward the row, or in the opposite direction from that shown. This cultivation may also be done with harrows or any other tool that will cultivate shallow (from 1 to 2 inches deep) and leave the land free from ridges and furrows.

Figure 11 shows a cultivator equipped with fertilizer attachments, so that a side application may be made at the time the corn is cultivated. Fertilizer-distributing attachments can be made for most kinds of corn cultivators, and manufacturers will produce them when there is a sufficient demand. In a large portion of the section covered by this bulletin such attachments, conveniently and substantially made for the types of cultivators illustrated in figures 8, 9, and 10, should not only economize the time and labor necessary for distributing the fertilizer, but by being able to supply the fertilizer at each of the cultivations a farmer will not need to apply a large quantity at any one time, and the danger of overstimulating growth will be practically eliminated.

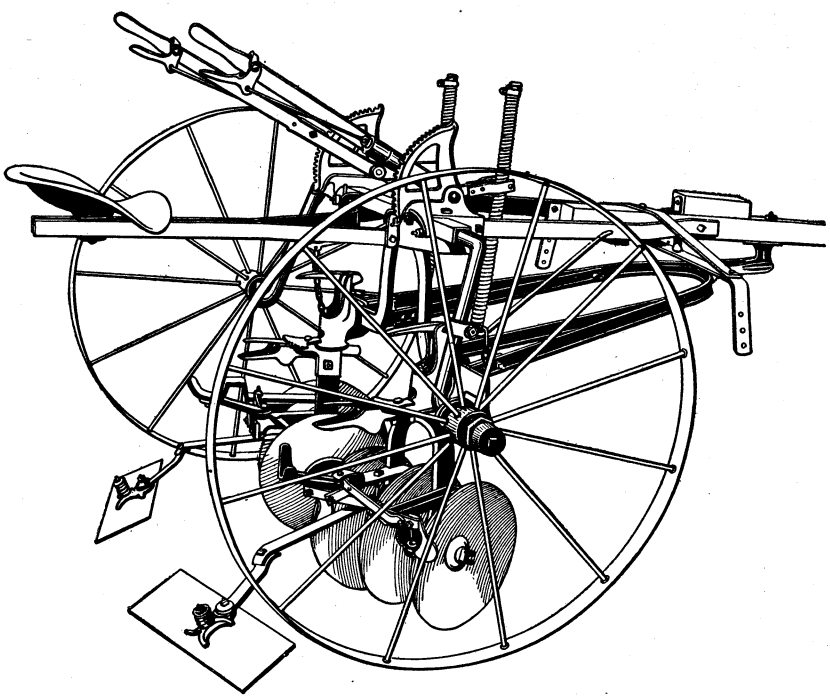

FIG. 9.—A disk cultivator equipped and adjusted so the land will be left level.

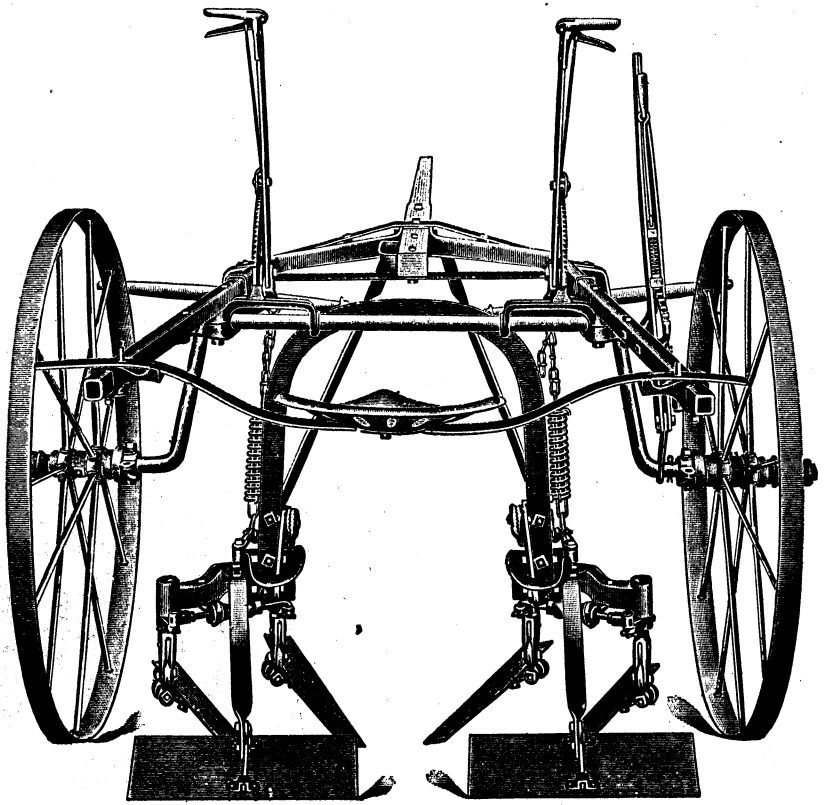

FIG. 10.—A cultivator specially adapted for level shallow cultivation.

SUMMARY.

The recommendations and suggestions made in this bulletin apply mostly to the cotton-growing sections of North Carolina, South Carolina, Georgia, Florida, and Alabama.

Drainage and coarse stable manure should be used to prevent the irregular patches in the field in which little or no corn grows.

More of the rainfall is retained when the land is broken from 8 to 10 inches deep and vegetable matter is supplied.

Humus economizes the labor of tilling the land and prolongs the good effects of cultivation.

Crops like cowpeas, velvet beans, vetch, the clovers, and beggarweeds may be made to supply both humus and nitrogen.

Commercial fertilizers should be used to supply such elements of plant food as can not be supplied by the soil and by cropping systems in sufficient quantity for the greatest profit.

The fertilizer formulas published by the North Carolina and South Carolina agricultural experiment stations are recommended.

Budworms may make it necessary to plant after the first of May, but drainage may relieve this condition.

The heaviest yields of corn are usually obtained by planting as soon as a permanent stand can be secured.

On warm well-drained land corn in furrows has the advantage over that planted by other methods, because its growth may be better controlled, serious injury to the roots in cultivating is avoided, and weeds and grass are more easily combated. Special attention is called to the desirability of using a lister.

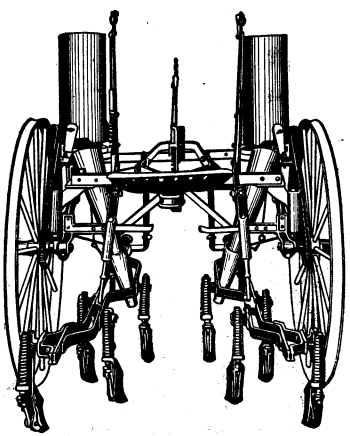

FIG. 11.—Riding cultivator equipped with fertilizer distributors.

The seed should be covered just deep enough to have sufficient moisture in which to germinate promptly.

A more uniform distribution of plants, resulting from a decrease in the distance between rows and an increase in the distance between plants in the rows, is often desirable, and this may be accomplished by the use of special machinery.

Most stands of corn are planted so as to allow from 8 to 12 square feet per plant. Plants of all corn varieties tend to adjust themselves to their growing conditions by increasing or decreasing the stalk yields, but as a general rule the varieties capable of the widest range of adjustment are those that have a strong tendency to produce more than one ear per stalk.

Crows may be deterred from eating the seed and pulling up the young plants by using coal tar.

Where the present methods fail to give a stand in cloddy or trashy land, a lister will usually succeed.

Where it is at all difficult to get the desired stand, extra seed should be planted. Thinning will usually result in greater economy than leaving a defective stand or replanting.

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